are made in the rewritten claims, is appended to this Amendment as Attachment A.

Please cancel claims 25, 26, and 29-35 without prejudice, and amend claims 9, 11, and 15 and 24 to read as follows:

9. (thrice amended) An analog, oligomer-based method for determining a mathematical result of carrying out an operation of vector or matrix algebra on input data,

wherein single-stranded oligomers E_i and $\underline{E}_i$ are a subset of all single-stranded oligomers and are each in 1:1 correspondence with the basis vectors $\boldsymbol{e}_i$, i = 1, 2,..., m in an abstract m-dimensional vector space;

wherein a set of the oligomers E_i and $\underline{E}_i$ represents an m-component vector $\boldsymbol{V} = \Sigma_i V_i \boldsymbol{e}_i$, wherein the E_i and $\underline{E}_i$ oligomers have complementary nucleotide sequences, with the E_i oligomers representing the i-th component of $\boldsymbol{V}$ for which the amplitude V_i is positive, and the $\underline{E}_i$ oligomers representing the i-th component of $\boldsymbol{V}$ for which V_i is negative; and

wherein the concentration of each of the oligomers E_i or $\underline{E}_i$ is proportional to the absolute value of the amplitude V_i of the i-th component of $\boldsymbol{V}$,

the method comprising the steps of

(1) obtaining a composition comprising at least one set of single-stranded oligomers E_i and $\underline{E}_i$ representing the components

of a vector, said composition comprising an oligomer representing a vector component with a positive amplitude and also comprising an oligomer representing a vector component with a negative amplitude, wherein the concentrations of the oligomers E_i or $\underline{E}_i$ in the composition are proportional to the absolute values of the amplitudes of the components they represent, which composition represents input data; and

2) subjecting said composition to at least one physical or chemical treatment having an effect on said oligomers in said composition that is an analog representation of an operation of vector or matrix algebra, and

(3) detecting the effect of said treatment on said oligomers in said composition to determine the analog result of carrying out said operation of vector or matrix algebra on said input data;

wherein said analog result of carrying out said operation of vector or matrix algebra on said input data is quantitatively dependent on the concentrations of said at least one set of single-stranded oligomers E_i and $\underline{E}_i$ in said composition.

I

I2 Sub C

11. (Thrice amended) The method of claim 10, wherein said at least one physical or chemical treatment in step (2) is selected from the group consisting of (a) changing the relative concentrations of the oligomers in said composition, (b)

allowing complementary oligomers in said composition to hybridize to each other, (c) determining the concentration of double-stranded oligomers in the composition, (d) separating double-stranded oligomers from non-double-stranded oligomers in the composition, (e) measuring the rate of hybridization of complementary oligomers in the composition, (f) ligating oligomers together, (g) adding oligomer subunits to an end of an oligomer in an enzyme-catalyzed reaction, (h) using an oligomer as a template in synthesizing a complementary oligomer sequence in a polymerase-catalyzed reaction, (i) phosphorylating or de-phosphorylating a 5′ terminus of an oligomer, and (j) cleaving an oligomer with a restriction enzyme.

15. (Twice amended) An analog, oligomer-based method for obtaining the outer product matrix of two vectors V_i for i = 1, 2, ..., m, and W_j for j = 1, 2, ..., n,

wherein single-stranded oligomers E_i and $\underline{E}_i$ are a subset of all single-stranded oligomers and are each in 1:1 correspondence with the basis vectors e_i, i = 1, 2,..., m in an abstract m-dimensional vector space;

wherein a set of the oligomers E_i and $\underline{E}_i$ represents an m-component vector $V = \Sigma_i V_i e_i$, wherein the E_i and $\underline{E}_i$ oligomers have complementary nucleotide sequences, with the $\underline{E}_i$ oligomers

representing the i-th component of *V* for which the amplitude V_i is positive, and the $\underline{E}_i$ oligomers representing the i-th component of *V* for which V_i is negative; and

wherein the concentration of each of the oligomers E_i or $\underline{E}_i$ is proportional to the absolute value of the amplitude V_i of the i-th component of *V*,

said method comprising obtaining a set of dimeric, single-stranded oligomers, each of which comprises (i) a first single-stranded oligomer sequence selected from the group consisting of E_i or $\underline{E}_i$ for each i-th component of ***V*** for i = 1, 2, ... m, which oligomer is joined at its 3′ end to the 5′ end of (ii) a second single-stranded oligomer sequence selected from the group consisting of E_j or $\underline{E}_j$ for each j-th component of **W** for all j = 1, 2,... n,

wherein the concentration of each of said dimeric oligomers comprising oligomer sequences corresponding to the i-th component of *V* and the j-th component of W is proportional to the product of the amplitudes of the i-th component of *V* and the j-th component of W.

24. (amended) The method of claim 23 wherein said solid support is, or is attached to, a silicon or Al_2O_3 chip.